

US EPA ARCHIVE DOCUMENT



Weston Solutions, Inc.
Suite 100
2501 Jolly Road
Okemos, Michigan 48864
517 381-5920 • Fax 517 381-5921

Technical Memorandum

TO: Ralph Dollhopf, United States Environmental Protection Agency

FROM: Sonny Rutkowski, Chris Lantinga, Weston Solutions, Inc.

DATE: November 13, 2012

SUBJECT: Enbridge Line 6B Oil Spill Kalamazoo River – Submerged Oil Containment
MDEQ Permitting Evaluation including HEC-RAS Modeling

At the request of the U.S. EPA, WESTON START has prepared the following brief Technical Memorandum to report the current status of the evaluation of MDEQ permitting requirements for potential submerged oil containment implementation including HEC-RAS modeling preliminary results. WESTON START has communicated routinely with the MDEQ floodplain engineer over the past several weeks regarding permit requirements and results of the ongoing HEC-RAS modeling. The purpose of the HEC-RAS is to determine the probable backwater affects on structures resulting from the proposed submerged oil containment structures within the three impoundment areas during 100-yr flood conditions.

Kickoff Meeting:

On Thursday, October 18th, 2012, representatives from U.S. EPA, MDEQ, and WESTON START met to discuss MDEQ permitting requirements and review submerged oil conditions and proposed submerged oil containment for each of the three impoundment areas. Subsequent to this meeting, the U.S. EPA tasked WESTON START to commence development of HEC-RAS models for each of the impoundment areas to simulate the proposed containment and the net increase of backwater elevations relative to the 100-yr flood event without containment.

Overflight & Boat Tour:

On Friday, October 26th, 2012 representatives from MDEQ and WESTON START observed the impounded submerged oil target area conditions during an overflight. Following the overflight, both representatives inspected the E4 half-curtain configuration deployed within the Morrow Lake Delta to observe containment assembly and flow conditions.

Initial Modeling Meeting:

On Thursday, November 1st, representatives from U.S. EPA's Environmental Response Team (ERT), MDEQ, and WESTON START met to discuss the HEC-RAS modeling efforts completed to date by WESTON START. The initial Morrow Lake Delta HEC-RAS modeling results were presented to the MDEQ flood plain engineer. Ceresco and Mill Pond impoundment modeling had

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been initiated at that point, but results were not yet fully developed at that time. The purpose of the November 1 meeting with the MDEQ was to ensure the proposed containment was simulated in the model correctly and to understand MDEQ concerns and regulatory requirements for analyses and submittals for backwater impacts. Of additional importance and discussion were the baseline downstream water surface boundary conditions, energy grade line, FEMA flood insurance studies to identify structures within the FEMA 100-yr flood plain, maps showing points and sections used to generate the HEC-RAS model, and various flows modeled (10-yr, 25-yr, and 100-yr floods). Based on initial review of the data presented, the MDEQ flood plain engineer concluded that the containment structures were very conservatively modeled within effective flow and could be considered reflective of site conditions with some additional modified inputs (downstream boundary water surface elevation).

Second Modeling Meeting:

On Friday, November 9th, representatives from U.S. EPA-ERT, MDEQ and WESTON START met again to review the HEC-RAS modeling output for each of the three impoundment areas. HEC-RAS outputs for each of the three impoundment areas were reviewed. Figures depicting HEC-RAS model sections, mile posts, and 100-yr flood plain as defined by the FEMA flood insurance studies were presented. Additionally, the energy grade line and the net backwater effects above the 100-yr flood event were presented in tabular form including structures within the flood plain in the vicinity of backwater effects.

The MDEQ flood plain engineer was in general agreement with the boundary conditions applied and the resultant water levels demonstrated by the HEC-RAS model outputs. The HEC-RAS results demonstrated that the effect of half sediment curtains placed within the Morrow Lake Delta yielded a 0.01 foot rise above the modeled 100 yr. flood elevation at a few localized upstream areas. The nearest structure within the 100-yr flood plain elevation (Brown House MP – ~36.00) is located upstream of the nearest 0.01 elevation increase. The HEC-RAS models for both Ceresco and Mill Ponds both demonstrated backwater effects above the 100-yr flood plain elevation, but likely negligible impacts to structures within the 100-yr flood plain.

At the conclusion of the meeting, the MDEQ flood plain engineer indicated the HEC-RAS model inputs and simulations presented were very conservative and would likely be permissible provided the backwater affects greater than 0.01 during a 100-yr flood did not occur at any structures within the 100-yr flood plain after the final model results were computed and checked.

The remaining task yet to be completed within each of the three HEC-RAS models includes generating maps showing all of the structures within the 100-yr flood plain, mapping out the backwater affects in plan-view, addition of the 100-yr flood plain developed by Enbridge, and replacing the USGS model sections with updated bathymetry sections.

Third Modeling Meeting:

On Friday November 16th, a third modeling meeting is scheduled to continue review and coordination between the U.S. EPA, WESTON START, and MDEQ related to the MDEQ permit requirements and HEC-RAS modeling results. MDEQ agreed at that meeting and during subsequent discussions that net backwater effects from installation of the curtains would not cause significant harm to structures within the 100 yr flood plain.